



# GRAIN INSPECTION, PACKERS AND STOCKYARDS ADMINISTRATION

Technical Services Division

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## U.S. WHEAT INSPECTION

### DEFINITION OF WHEAT

Wheat is defined as: Grain that, before the removal of dockage, consists of 50 percent or more common wheat (*Triticum aestivum* L.), Club wheat (*T. compactum* Host.), and Durum wheat (*T. durum* Desf.) and not more than 10 percent of other grains for which standards have been established under the United States Grain Standards Act and that, after the removal of dockage, contains 50 percent or more of whole kernels of one or more of these wheats.

Whole kernels are kernels with three-fourths or more of the kernel present. Other grains for which standards have been established are barley, canola, corn, flaxseed, oats, rye, sorghum, soybeans, sunflower seed, and triticale.

### CLASSES

Wheat is divided into eight classes based on color and kernel and varietal characteristics:

**Durum Wheat.** All varieties of white (amber) Durum wheat. This class is divided into the following three subclasses: Hard Amber Durum Wheat, Amber Durum Wheat, and Durum Wheat.

**Hard Red Spring Wheat.** All varieties of Hard Red Spring wheat. This class is divided into the following three subclasses: Dark Northern Spring Wheat, North-ern Spring Wheat, and Red Spring Wheat.

**Hard Red Winter Wheat.** All varieties of Hard Red Winter wheat.

**Soft Red Winter Wheat.** All varieties of Soft Red Winter wheat.

**Hard White Wheat.** All hard endosperm white wheat varieties.

**Soft White Wheat.** All soft endosperm white wheat varieties. This class is divided into the following three subclasses: Soft White Wheat, White Club Wheat, Western White Wheat.

**Unclassed Wheat.** Any variety of wheat which is not classifiable under other criteria provided in the wheat standards. This class includes any wheat which is other than red or white in color.

**Mixed Wheat.** Any mixture of wheat which consists of less than 90 % of one class and more than 10 % of another class or classes of wheat.

### SPECIAL GRADES

**Ergoty:** Wheat that contains more than 0.05 percent of ergot.

**Garlicky Wheat.** Wheat that contains in a 1,000-gram portion more than two green garlic bulblets or an equivalent quantity of dry or partly dry bulblets.

**Infested Wheat.** Wheat that is infested with live weevils or other live insects injurious to stored grain.

**Light Smutty Wheat.** Wheat that has an unmistakable odor of smut or which contains, in a 250-gram portion, smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 5 smut balls, but not in excess of a quantity equal to 30 smut balls of average size.

**Smutty Wheat.** Wheat that contains in a 250-gram portion, smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 30 smut balls of average size.

**Treated Wheat.** Wheat that has been scoured, limed, washed, sulfured, or treated in such a manner that the true quality is not reflected by either the numerical grades or the U.S. Sample grade designation alone.

## **WHEAT GRADING STEPS**

STEP 1. Examine the sample for heating, odor, animal filth, castor beans, crotalaria seeds, garlic, glass, insect infestation, unknown foreign substances, and other unusual conditions.

STEP 2. Determine the moisture content.

STEP 3. Determine the percentage of dockage in the sample.

STEP 4. Examine the dockage-free sample for ergot, smut, and stones.

STEP 5. Determine the test weight per bushel of the dockage-free sample.

STEP 6. Divide out a representative portion from the dockage-free sample and determine the percentage of shrunken and broken kernels (SHBN).

STEP 7. Divide out representative portions from the SHBN-free sample and determine the percentage of class, contrasting classes, damaged kernels, heat-damaged kernels, foreign material, subclass, and wheat of other classes.

**MOISTURE.** While not a grading factor, moisture is determined on all wheat samples graded by the official inspection system. The moisture content of grain is very important to its storability and can affect end-use.

**DOCKAGE.** All matter other than wheat that can be removed from the original sample by use of an approved device according to procedures prescribed in FGIS instructions. Also, underdeveloped, shriveled, and small pieces of wheat kernels removed in properly separating the material other than wheat and that cannot be recovered by properly rescreening or recleaning.

**TEST WEIGHT.** The weight per Winchester bushel (2,150.42 cubic inches) as determined using an approved device according to procedures prescribed in FGIS instructions.

**DAMAGED KERNELS.** Kernels, pieces of wheat kernels, and other grains that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

**FOREIGN MATERIAL.** All matter other than wheat that remains in the sample after the removal of dockage and shrunken and broken kernels.

**SHRUNKEN AND BROKEN KERNELS.** All matter that passes through a 0.064 x 3/8 oblong-hole sieve after sieving.

**DEFECTS.** Damaged kernels, foreign material, and shrunken and broken kernels. The sum of these three factors may not exceed the limit for the factor "Defects" for each numerical grade.

**WHEAT OF OTHER CLASSES.** Wheat of other classes is the total of all classes of wheat other than the predominating class and which, combined with the predominating class, meets the requirements for any one of the classes except Mixed wheat. Wheat of other classes includes contrasting classes. Wheat of other classes is not applicable to Durum wheat.

**CONTRASTING CLASSES.** Contrasting classes are defined as: (1) Durum wheat, Hard White wheat, Soft White wheat, and Unclassed wheat in the classes Hard Red Spring wheat and Hard Red Winter wheat; (2) Hard Red Spring wheat, Hard Red Winter wheat, Hard White wheat, Soft Red Winter wheat, Soft White wheat, and Unclassed wheat in the class Durum wheat; (3) Durum wheat and unclassified wheat in the class Soft Red Winter wheat; and (4) Durum wheat, Hard Red Spring wheat, Hard Red Winter wheat, Soft Red Winter wheat, and Unclassed wheat in the classes Hard White wheat and Soft White wheat.

## WHEAT GRADES AND GRADE REQUIREMENTS

Grade	Minimum Limits of--		Maximum limits of--						
	Test weight per bushel		Damaged kernels		Foreign material (percent)	Shrunken & broken kernels (percent)	Defects 1/ (percent)	Wheat of other classes 2/	
	Hard Red Spring or White Club Wheat (pounds)	All other classes & subclasses (percent)	Heat damage (part of total) (percent)	Total (percent)				Contrasting classes (percent)	Total 3/ (percent)
U.S. No. 1	58.0	60.0	0.2	2.0	0.4	3.0	3.0	1.0	3.0
U.S. No. 2	57.0	58.0	0.2	4.0	0.7	5.0	5.0	2.0	5.0
U.S. No. 3	55.0	56.0	0.5	7.0	1.3	8.0	8.0	3.0	10.0
U.S. No. 4	53.0	54.0	1.0	10.0	3.0	12.0	12.0	10.0	10.0
U.S. No. 5	50.0	51.0	3.0	15.0	5.0	20.0	20.0	10.0	10.0

### SAMPLE GRADE

U.S. Sample grade is wheat that:

- (a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4, or 5; or
- (b) Contains 4 or more stones or any number of stones which have an aggregate weight in excess of 0.1 percent of the sample weight, 1 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans (*Ricinus communis* L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic foreign substance(s), 2 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth per 1,000 grams of wheat; or
- (c) Contains 5 or more animal filth, castor beans, crotalaria seeds, glass, stones, or unknown foreign substance(s) in any combination; or
- (d) Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor); or
- (e) Are heating or otherwise of distinctly low quality.
- (f) Contains more than 31 insect-damaged kernels in 100 grams.

1/ Includes damaged kernels (total), foreign material, and shrunken and broken kernels.

2/ Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.

3/ Includes contrasting classes.

### BASIS OF DETERMINATION

Lot as a Whole	Factors Determined Before the Removal of Dockage	Factors Determined After the Removal of Dockage	Factors Determined After the Removal of Dockage and Shrunken and Broken Kernels
Distinctly low quality Heating Infested Odor	Distinctly low quality Garlicky Heating Infested Kind of grain Moisture Odor Odor (smut) Other unusual conditions U.S. Sample grade factors	Ergot Kind of grain Odor Shrunken & broken kernels Smut Stones Test weight Treated	Class Contrasting classes Damaged kernels (total) Foreign material Heat-damaged kernels Subclass Wheat of other classes

## OPTIONAL SERVICES

Other services also available for describing the quality and characteristics of wheat are protein content, falling number, hardness, aflatoxin, vomitoxin, ethylene dibromide residues, and pesticide residues.

### Processing The Work Sample

